PHYTOTOXICOLOGY
SECTION INVESTIGATION
AT THE SITE OF
THE HCL SPILL
ON HIGHWAY 2, BRANT COUNTY
APRIL 26, 1990

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Report prepared by:

Phytotoxicology Section
Air Resources Branch
Ontario Ministry of the Environment

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Section 1: Background

At 1:30 on the morning of April 26, 1990 a tanker truck of concentrated hydrochloric acid (37%) overturned and burned on Highway 2 approximately one kilometer west of the Brant County Hamilton Wentworth Municipality border. Approximately 6000 liters of acid were spilled from the tanker. The acid ran off into the road-side ditch and down a farm lane between the D. Hunter and J.W. Hunter properties and into the D. Hunter pond. The spill was brought under control by 8:30 am.

Gas clouds were generated from the spilled acid between 1:30 and 8:30 am. The concentration of HCl in the gas cloud was estimated to be between 40 to 50 ppm near the truck and falling to less than 10 ppm 100 meters from the truck. The winds during this period where light (<10 km/hr) and variable from the west half of the compass. Fields to the immediate east of the spill on both the north and south sides of Hwy 2 were reported to off-gas a white cloud during the day.

By the morning of April 27, 1990 the area had largely been cleaned up. The truck had been removed and the majority of the soil that had been contaminated with acid had been excavated and removed.

Section 2: Methods

Mr. R.D. Jones of the Phytotoxicology Section, Air Resources Branch, Ministry of the Environment visited the accident site on three occasions (April 27, May 3, and May 18, 1990) to determine the extent of injury to vegetation in the area. No vegetation or soil samples were collected for chemical analysis. Previous experience has shown that, in the case of acute chloride related fumigations, the amount of accumulation of chloride in vegetation is not significant when compared to the already large amount of naturally occurring chloride in vegetation. In addition, there was evidence of significant road salt injury to a number of plants in the area, further adding to the already high background levels of chloride. In the case of the soil, all soil directly in contact with the acid had been excavated by the time of the first investigation.

Visual observations and a sketch map of the area were made on all three visits and photographs of the area were taken on April 27, 1990.

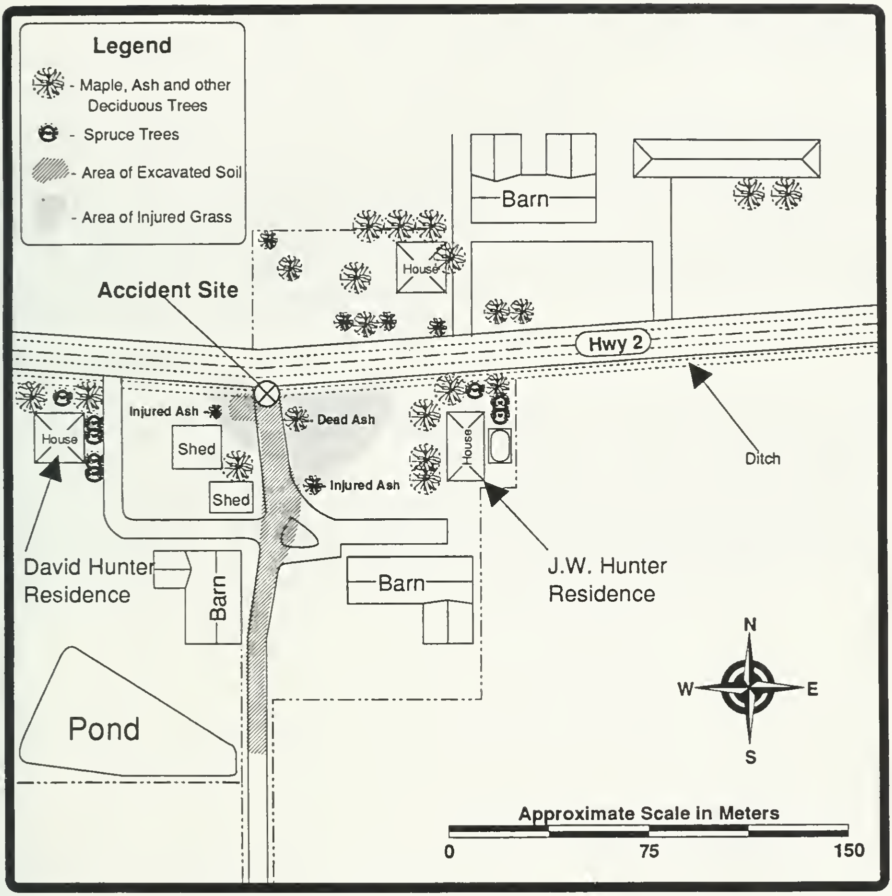
Section 3: Results and Discussion

On the morning of April 27, the only injury to vegetation in the vicinity of the accident that could be attributed to the HCl gas cloud, was limited to an area approximately 25 meters in radius to the south of the accident site (see attached Figure). This injury consisted of tip burning to the top 15 to 30% of grass blades and dandelion leaves. The injury was not fully developed at the time and had a typical water soaked appearance. In addition to the acid gas injury, the grass in the vicinity of where the truck cab burned also showed of heat damage.

None of the deciduous trees had leafed out at the time of the accident, but the maple trees were in flower. No injury was observed on any of the maple flowers on the three properties in the immediate vicinity of the spill.

Spruce trees on the D. Hunter property near the house had a light stipple on the upper surface of the needles. The trees were generally in poor to moderate condition, with the condition of the trees improving with increasing distance from the road.

Sketch Map of the Area in the Immediate Vicinity of the HCL Spill on Highway 2, Brant County, April 26, 1990



Note: The locations, scale, number and type of trees, buildings and roads are approximations only.

The spruce trees on the J.W. Hunter property were in a similar condition to the trees on the D. Hunter property. These trees were only 10 meters from the highway and appeared to be suffering from road salt stress. The coniferous shrubs on the north and west side of the J.W. Hunter residence were showing varying degrees of injury. The injury was typically a red-tan necrosis on both yew and juniper. There was also some light tan coloured injury to cedar on the west side of the house. All of this injury was well developed and there was no sign of new injury to these shrubs.

There was no visible injury to grass, trees or shrubs on the property on the north side of the highway.

As the deciduous trees and shrubs had not leafed out at the time of the accident, two further visits were made to determine if the acid gas had caused injury to the buds on the trees. Bud injury would prevent opening, or damage the leaves when they flushed out. On the May 3rd visit the injury to the grass and dandelions had fully developed. The injury was limited to the top 50% of the leaves. The extent of the injury was greater than originally estimated on April 27, with the injury extending out to approximately a 30 meter radius. There was no new injury symptoms on any of the spruce trees or coniferous shrubs. The silver and Manitoba maple trees had leafed out with no signs of injury. The ash trees had not leafed out at this time.

The final visit was made on May 18. The grass and dandelions had completely grown out of the injury observed on the previous visits. The only visible damage to vegetation at this time was to the three ash trees in the immediate vicinity of the crash site. The ash tree, 22 cm DBH, located approximately 5 meters south of the crash site appeared to be totally dead. The leaf buds were black and desiccated. There was no sign that the tree was going to leaf out. The small ash tree, 6 cm DBH, located approximately 20 meters to the west of the crash site was severely injured. Only ten percent of the leaf buds had opened. The rest of the buds were black and desiccated. The small ash tree approximately 35 meters south of the crash site was lightly injured, with 10 to 15% of the leaf buds dead, mainly on the side facing the accident site.

Section 4: Summary

The only permanent injury to vegetation from the HCl spill on Highway 2, Brant County on April 26, 1990 was to two ash trees within 20 meters of the accident site. The one tree was dead and the other severely injured. The injury to a third ash tree was not enough to cause permanent damage. The injury to the lawn area, within 30 meters of the site, was temporary and the lawn had fully recovered by May 18, 1990. Other injury observed on trees and shrubs on the three properties in the immediate vicinity of the accident was attributed to road salt from the highway. There was no evidence of migration of the acid through the soil, with resulting damage to plant roots, as all of the soil that had come into contact with the acid had been excavated by April 27.